

Contract # 069163**STATE OF UTAH CONTRACT**

1. **CONTRACTING PARTIES:** This contract is between the following agency of the State of Utah:
Department of Transportation Agency Code: 810 Traffic Management, Division referred to as (STATE), and the following CONTRACTOR:

Adaptive Micro System LLC
Name

7840 N 86th Street
Address

Milwaukee WI 53224
City State Zip

LEGAL STATUS CONTRACTOR

☐ Sole Proprietor
☐ Non-Profit Corporation
☒ For-Profit Corporation
☐ Partnership
☐ Government Agency

Contact Person Jack Stubbe Phone (414)357-2020 Ex 207 Email: jack.stubbe@adaptivedisplay.com
Federal Tax ID# 16-1684503 Vendor #121329A Commodity Code # 801650000000

2. **GENERAL PURPOSE OF CONTRACT:** The general purpose of this contract is to provide:

Contractor will retrofit UDOT's existing fiber optic shutter DMS manufactured by MARK IV with new LED equipment. Contractor will provide the LED retrofit equipment, installation of the equipment, spare parts, and training. There will be forty-seven signs using the LED technology. The existing housing would be used without significant structure modifications.

3. **PROCUREMENT:** This contract is entered into as a result of the procurement process on **RX# 66000000031, FY06 GL6019.**
4. **CONTRACT PERIOD:** Effective date **07 February 2006** Termination date **31 November 2007** unless terminated early or extended in accordance with the terms and conditions of this contract. (1) one year renewal options.
5. **CONTRACT COSTS:** This is a requirements Contract. The CONTRACTOR will be paid per the prices as detail in Attachment B, of the contract.
6. **ATTACHMENT A:** Division of Purchasing's Standard Terms and Conditions
ATTACHMENT B: Scope of Work Price/ List
ATTACHMENT C: Special Terms and Conditions
ATTACHMENT D: Spare Parts Price List
Any conflicts between Attachment A and other Attachments will be resolved in favor of Attachment A.
7. **DOCUMENTS INCORPORATED INTO THIS CONTRACT BY REFERENCE BUT NOT ATTACHED:**
a. All other governmental laws, regulations, or actions applicable to the goods and/or services authorized by this contract.
b. Utah State Procurement Code, Procurement Rules, and CONTRACTOR'S response to Bid #GL6019 dated 11/02/05.

IN WITNESS WHEREOF, the parties sign and cause this contract to be executed.

CONTRACTOR

Contractor's signature

Date

Thomas Mandler, President
Type or Print Name and Title

STATE

Kelvin G. Thacker, Procurement Services Manager Date

Director, Division of Purchasing

Date

CONTRACT RECEIVED AND
PROCESSED BY

Director, Division of Finance

Date

MAY 23 2006

MAY 24 2006

Denice McCarthy
Agency Contact Person

(801) 965- 4761
Telephone Number

(801) 965-4073
Fax Number

dmccarthy@utah.gov
Email Address

ATTACHMENT A: STATE OF UTAH STANDARD TERMS AND CONDITIONS

ATTACHMENT A: STATE OF UTAH STANDARD TERMS AND CONDITIONS

1. **AUTHORITY:** Provisions of this contract are pursuant to the authority set forth in 63-56, Utah Code Annotated, 1953, as amended, Utah State Procurement Rules (Utah Administrative Code Section R33), and related statutes which permit the State to purchase certain specified services, and other approved purchases for the State.
2. **CONTRACT JURISDICTION, CHOICE OF LAW, AND VENUE:** The provisions of this contract shall be governed by the laws of the State of Utah. The parties will submit to the jurisdiction of the courts of the State of Utah for any dispute arising out of this Contract or the breach thereof. Venue shall be in Salt Lake City, in the Third Judicial District Court for Salt Lake County.
3. **LAWS AND REGULATIONS:** The Contractor and any and all supplies, services, equipment, and construction furnished under this contract will comply fully with all applicable Federal and State laws and regulations.
4. **RECORDS ADMINISTRATION:** The Contractor shall maintain, or supervise the maintenance of all records necessary to properly account for the payments made to the Contractor for costs authorized by this contract. These records shall be retained by the Contractor for at least four years after the contract terminates, or until all audits initiated within the four years, have been completed, whichever is later. The Contractor agrees to allow State and Federal auditors, and State Agency Staff, access to all the records to this contract, for audit and inspection, and monitoring of services. Such access will be during normal business hours, or by appointment.
4. **CONFLICT OF INTEREST:** Contractor represents that none of its officers or employees are officers or employees of the State of Utah, unless disclosure has been made in accordance with 67-16-8, Utah Code Annotated, 1953, as amended.
5. **CONTRACTOR, AN INDEPENDENT CONTRACTOR:** The Contractor shall be an independent contractor, and as such, shall have no authorization, express or implied, to bind the State to any agreements, settlements, liability, or understanding whatsoever, and agrees not to perform any acts as agent for the State, except as herein expressly set forth. Compensation stated herein shall be the total amount payable to the Contractor by the State. The Contractor shall be responsible for the payment of all income tax and social security amounts due as a result of payments received from the State for these contract services. Persons employed by the State and acting under the direction of the State shall not be deemed to be employees or agents of the Contractor.
6. **INDEMNITY CLAUSE:** The Contractor agrees to indemnify, save harmless, and release the State of Utah, and all its officers, agents, volunteers, and employees from and against any and all loss, damages, injury, liability, suits, and proceedings arising out of the performance of this contract which are caused in whole or in part by the negligence of the Contractor's officers, agents, volunteers, or employees, but not for claims arising from the State's sole negligence.
7. **EMPLOYMENT PRACTICES CLAUSE:** The Contractor agrees to abide by the provisions of Title VI and VII of the Civil Rights Act of 1964 (42USC 2000e) which prohibits discrimination against any employee or applicant for employment or any applicant or recipient of services, on the basis of race, religion, color, or national origin; and further agrees to abide by Executive Order No. 11246, as amended, which prohibits discrimination on the basis of sex; 45 CFR 90 which prohibits discrimination on the basis of age; and Section 504 of the Rehabilitation Act of 1973, or the Americans with Disabilities Act of 1990 which prohibits discrimination on the basis of disabilities. Also, the Contractor agrees to abide by Utah's Executive Order, dated March 17, 1993, which prohibits sexual harassment in the work place.
1. **SEPARABILITY CLAUSE:** A declaration by any court, or any other binding legal source, that any provision of this contract is illegal and void shall not affect the legality and enforceability of any other provision of this contract, unless the provisions are mutually dependent.
8. **RENEGOTIATION OR MODIFICATIONS:** This contract may be amended, modified, or supplemented only by written amendment to the contract, executed by the same persons or by persons holding the same position as persons who signed the original agreement on behalf of the parties hereto, and attached to the original signed copy of the contract. Automatic renewals will not apply to this contract.
1. **DEBARMENT:** The Contractor certifies that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction (contract), by any governmental department or agency. If the Contractor cannot certify this statement, attach a written explanation for review by the State. The Contractor must notify the State Director of Purchasing within 30 days if debarred by any governmental entity during the Contract period.
12. **TERMINATION:** Unless otherwise stated in the Special Terms and Conditions, this contract may be terminated, with cause by either party, in advance of the specified termination date, upon written notice being given by the other party. The party in violation will be given ten (10) working days after notification to correct and cease the violations, after which the contract may be terminated for cause. This contract may be terminated without cause, in advance of the specified expiration date, by either party, upon 90 days prior written notice being given the other party. On termination of this contract, all accounts and payments will be processed according to the financial arrangements set forth herein for approved services rendered to date of termination.
13. **NONAPPROPRIATION OF FUNDS:** The Contractor acknowledges that the State cannot contract for the payment of funds not yet appropriated by the Utah State Legislature. If funding to the State is reduced due to an order by the Legislature or the Governor, or is required by State law, or if federal funding (when applicable) is not provided, the State may terminate this contract or proportionately reduce the services and purchase obligations and the amount due from the State upon 30 days written notice. In the case that funds are not appropriated or are reduced, the State will reimburse Contractor for products delivered or services performed through the date of cancellation or reduction, and the State will not be liable for any future commitments, penalties, or liquidated damages.
14. **SALES TAX EXEMPTION:** The State of Utah's sales and use tax exemption number is E33399. The tangible personal property or services being purchased are being paid from State funds and used in the exercise of that entity's essential functions. If the items being purchased are construction materials, they will be converted into real property by employees of this government entity, unless otherwise stated in the contract.
15. **WARRANTY:** The Contractor agrees to warrant and assume responsibility for all products (including hardware, firmware, and/or software products) that it licenses, contracts, or sells to the State of Utah under this contract for a period of one year, unless otherwise specified and mutually agreed upon elsewhere in this contract. The Contractor (seller) acknowledges that all warranties granted to the buyer by the Uniform Commercial Code of the State of Utah apply to this contract. Product liability disclaimers and/or warranty disclaimers from the seller are not applicable to this contract unless otherwise specified and mutually agreed upon elsewhere in this

contract. In general, the Contractor warrants that: (1) the product will do what the salesperson said it would do, (2) the product will live up to all specific claims that the manufacturer makes in their advertisements, (3) the product will be suitable for the ordinary purposes for which such product is used, (4) the product will be suitable for any special purposes that the State has relied on the Contractor's skill or judgment to consider when it advised the State about the product, (5) the product has been properly designed and manufactured, and (6) the product is free of significant defects or unusual problems about which the State has not been warned. Remedies available to the State include the following: The Contractor will repair or replace (at no charge to the State) the product whose nonconformance is discovered and made known to the Contractor in writing. If the repaired and/or replaced product proves to be inadequate, or fails of its essential purpose, the Contractor will refund the full amount of any payments that have been made. Nothing in this warranty will be construed to limit any rights or remedies the State of Utah may otherwise have under this contract.

16. **PUBLIC INFORMATION:** Except as identified in writing and expressly approved by the State Division of Purchasing, Contractor agrees that the contract and related Sales Orders and Invoices will be public documents, and may be available for distribution. Contractor gives the State express permission to make copies of the contract, the response to the solicitation, and related Sales Orders and Invoices in accordance with the State of Utah Government Records Access and Management Act. The permission to make copies as noted will take precedence over any statements of confidentiality, proprietary information, copyright information, or similar notation.
17. **DELIVERY:** Unless otherwise specified in this contract, all deliveries will be F.O.B. destination with all transportation and handling charges paid by the Contractor. Responsibility and liability for loss or damage will remain with Contractor until final inspection and acceptance when responsibility will pass to the State except as to latent defects, fraud and Contractor's warranty obligations.
18. **ORDERING AND INVOICING:** All orders will be shipped promptly in accordance with the delivery schedule. The Contractor will promptly submit invoices (within 30 days of shipment or delivery of services) to the State. The State contract number and/or the agency purchase order number shall be listed on all invoices, freight tickets, and correspondence relating to the contract order. The prices paid by the State will be those prices listed in the contract. The State has the right to adjust or return any invoice reflecting incorrect pricing.
19. **PAYMENT:** Payments are normally made within 30 days following the date the order is delivered or the date a correct invoice is received, whichever is later. All payments to the Contractor will be remitted by mail unless paid by the State of Utah's Purchasing Card (major credit card).
20. **PATENTS, COPYRIGHTS, ETC.:** The Contractor will release, indemnify and hold the State, its officers, agents and employees harmless from liability of any kind or nature, including the Contractor's use of any copyrighted or un-copyrighted composition, secret process, patented or un-patented invention, article or appliance furnished or used in the performance of this contract.
21. **ASSIGNMENT/SUBCONTRACT:** Contractor will not assign, sell, transfer, subcontract or sublet rights, or delegate responsibilities under this contract, in whole or in part, without the prior written approval of the State.
22. **DEFAULT AND REMEDIES:** Any of the following events will constitute cause for the State to declare Contractor in default of the contract: 1. Nonperformance of contractual requirements; 2. A material breach of any term or condition of this contract. The State will issue a written notice of default providing a ten (10) day period in which Contractor will have an opportunity to cure. Time allowed for cure will not diminish or eliminate Contractor's liability for damages. If the default remains, after Contractor has been provided the opportunity to cure, the State may do one or more of the following: 1. Exercise any remedy provided by law; 2. Terminate this contract and any related contracts or portions thereof; 3. Impose liquidated damages, if liquidated damages are listed in the contract; 4. Suspend Contractor from receiving future solicitations.
23. **FORCE MAJEURE:** Neither party to this contract will be held responsible for delay or default caused by fire, riot, acts of God and/or war which is beyond that party's reasonable control. The State may terminate this contract after determining such delay or default will reasonably prevent successful performance of the contract.
24. **PROCUREMENT ETHICS:** The Contractor understands that a person who is interested in any way in the sale of any supplies, services, construction, or insurance to the State of Utah is violating the law if the person gives or offers to give any compensation, gratuity, contribution, loan or reward, or any promise thereof to any person acting as a procurement officer on behalf of the State, or who in any official capacity participates in the procurement of such supplies, services, construction, or insurance, whether it is given for their own use or for the use or benefit of any other person or organization (63-56-1002, Utah Code Annotated, 1953, as amended).
25. **CONFLICT OF TERMS:** Contractor Terms and Conditions that apply must be in writing and attached to the contract. No other Terms and Conditions will apply to this contract including terms listed or referenced on a Contractor's website, terms listed in a Contractor quotation/sales order, etc. In the event of any conflict in the contract terms and conditions, the order of precedence shall be: 1. Atth. A: State of Utah Standard Terms and Conditions; 2. State of Utah Contract Signature Page(s); 3. State Additional Terms and Conditions; 4. Contractor Terms and Conditions.
26. **ENTIRE AGREEMENT:** This Agreement, including all Attachments, and documents incorporated hereunder, and the related State Solicitation constitutes the entire agreement between the parties with respect to the subject matter, and supersedes any and all other prior and contemporaneous agreements and understandings between the parties, whether oral or written. The terms of this Agreement shall supersede any additional or conflicting terms or provisions that may be set forth or printed on the Contractor's work plans, cost estimate forms, receiving tickets, invoices, or any other related standard forms or documents of the Contractor that may subsequently be used to implement, record, or invoice services hereunder from time to time, even if such standard forms or documents have been signed or initialed by a representative of the State. The parties agree that the terms of this Agreement shall prevail in any dispute between the terms of this Agreement and the terms printed on any such standard forms or documents, and such standard forms or documents shall not be considered written amendments of this Agreement.

Attachment B -Scope of work

BACKGROUND

Over the past seven years the Utah Department of Transportation have installed forty-seven (47) MARK IV Electrical mechanical Walk-in Dynamic Message Signs using fiber-optic shutter technology. Since that time, Light Emitting Diodes (LED) technology has progressed to a level that the Department would like to retrofit the forty-seven signs using the LED technology.

SCOPE OF WORK

This contract will provide the material to retrofit UDOT's present fiber optic shutter Dynamic Message Signs (DMS) to LED technology . To including new parts for LED retrofit equipment, installation of the equipment, spare parts, and training. The existing housing would be used without significant structure modifications.

UDOT will start with retrofitting one (1) sign and follow with releases of groups of 10 signs, with approval by the State, which need to occur 90 days prior to installation. The State retains the option to do of-retrofit work (line item #5).

Expected Installation Schedule:

Month	Qty of Retrofits	Line Items
July 06	1	1, 2, 3, 8
Sept 06	10	4, 5, 6 (Partial)
Dec 06	10	4, 5, 6 (Partial)
Feb 07	10	4, 5, 6 (Partial)
Apr 07	10	4, 5, 6 (Partial)
June 07	6	4, 5, 6 (Completed)

The first DMS to be retrofitted:

Located at I-215 milepost 21.17. This sign is on northbound I-215 west between California Avenue and I-80. A photograph of the outside, inside of the sign housing and the sign cabinet are shown in Attachment D Section 2 "Housing and Cabinet Characteristics".

The following items are to be incorporated in the scope of work.

Item 1, 2, 4, and 5 on price list will be supplied with LED equipment to retrofit the first DMS. The equipment will include the following:

1. LED Panels (See Attachment D section 3 LED Technology and Attachment D section 4 Overhead Freeway DMS Display)
2. DMS Controller (See Attachment D section 8 for the DMS Controller specifications)

3. Photocells (See Attachment D section 7 for the Photocell specifications)
4. NTCIP Requirements (See Attachment D section 11 for the NTCIP specifications)
5. Other miscellaneous parts needed to make a complete, functional sign compatible with UDOT's existing software
6. One (1) spare LED display module is to be included with each sign and furnished as part of the contract unit price.
7. Warranty (See Attachment D section 15 for the Warranty Provisions specifications)

Items 3 and 6 on the price list to be installed with LED retrofit equipment. The installation will include the following:

1. Installation
 - a. Installation shall include all mobilization, labor, workmanship, and installation equipment required to install the LED retrofit equipment.
2. Traffic Control
 - a. Each DMS has a catwalk to access the sign. The contractor will be required to supply a shoulder closure as defined by the most recent addition of the Manual on Uniform Traffic Control Devices (MUTCD).
3. Limitation of Work
 - a. To ensure that the construction has a minimal impact of traffic, the contractor will have to submit a traffic control plan to the Region Traffic Engineer. The traffic control plans will have to be approved by the Region Traffic Engineer, prior to the beginning work. The project manager will supply the Contractor the contact information for the Region Traffic Engineer.
4. Location of Work
 - a. All installation work to be done with sign in place. All work will be performed within the DMS housing. Controller location will remain in the cabinet. The existing cabinet will be used.
5. Removal of existing fiber-optic equipment.
 - a. Existing equipment must be salvaged in a reusable intact condition. Removed equipment will be delivered to a location at UDOT's Traffic Operation Center 2060 South 2760 West, Salt Lake City, Utah
6. Minimum Installation
 - a. Installation of LED panels
 - b. Installation of replacement of photocells
 - c. Installation of controller
7. Schedule
 - a. DMS cannot be out of service for more than **three calendar days**.

8. Testing and Acceptance Procedure
 - a. The specification for testing and acceptance are found in Attachment D section 13

Item 7 Engineering Services

1. Engineering Services (See Attachment D section 14 Engineering Services)

Item 8 Training

1. Training of State personnel after the installation of sign number 1. (See attachment D section 16 for training details) The detailed **schematic drawings and maintenance manuals for the LED retrofit equipment** are to be submitted during this training. (See Attachment D section 16 for the Training specifications)

Item 9 Spare Parts

1. Spare Parts - Percent discount off list price, for other related items (See Attachment D section 12 for the Spare Parts specifications)

Contractor will be required to submit detailed **schematic drawings and furnish maintenance manuals for the LED retrofit equipment** at the training for the installation of the LED equipment in sign number 1.

DMS housing and cabinets information is in Attachment D section 2.

Section 1: GENERAL INFORMATION

The existing DMS are full matrix walk in access display. The retrofit DMS will include LED sign modules, NTCIP conformant DMS controller, all required internal cabinet cabling, and utilize existing sign cabinet, ground cabinet, and wiring between ground and sign cabinets.

(a) Approximate dimensions

Maintain existing sign dimension

(b) Approximate proposed weight

The retrofit sign will not exceed current signs weight.

Manufacturing and Design Standards

The retrofit DMS will comply with the most recent version of the following standards:

- **High Voltage Wiring** – High voltage components and circuits (120 VAC) shall be wired and color-coded per the National Electric Code
- **Environmental** – The display and all display components shall conform to NEMA TS1 Section 2. Environmental Standards.
- **Shock/Vibration** – The display and all display components shall conform to NEMA TS1 Section 2 shock/vibration tests.
- **NTCIP** – See NTCIP Section

Delivery Schedule

A maximum 90-day delivery schedule for retrofit equipment after receipt of order is required. On Item 1 Includes 3-day installation time
Delivery time for spare parts will be maximum of 30 days.

Section 2: HOUSING and CABINET CHARACTERISTICS

Existing Sign Housing Information:

- a. Manufacture: MARK IV
- b. 28 Pixel panels 7 panels across and 4 panels high totaling 105 Pixels across and 28 pixels high, 2.6" pitch
- c. Panel support rail: 40 1/8 inch apart
- d. Panel Size: 38 7/8 inch wide and 18 1/8 inch high
- e. One (1) 50 amp breaker
- f. Nine (9) 15 amp breakers

The current housing module mounting rails will be used.

Existing Sign Cabinet

Cabinet type: 330 series cabinet

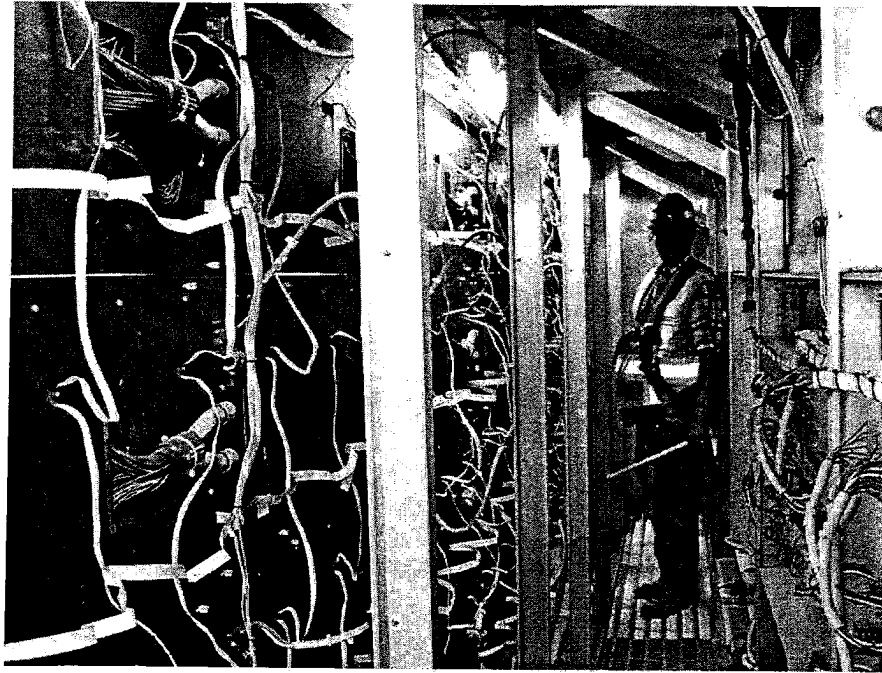
Outside measurement: 30 inch wide and 49 1/2 inch tall

Inside measurement: 27 3/8 inch wide and 39 inch tall

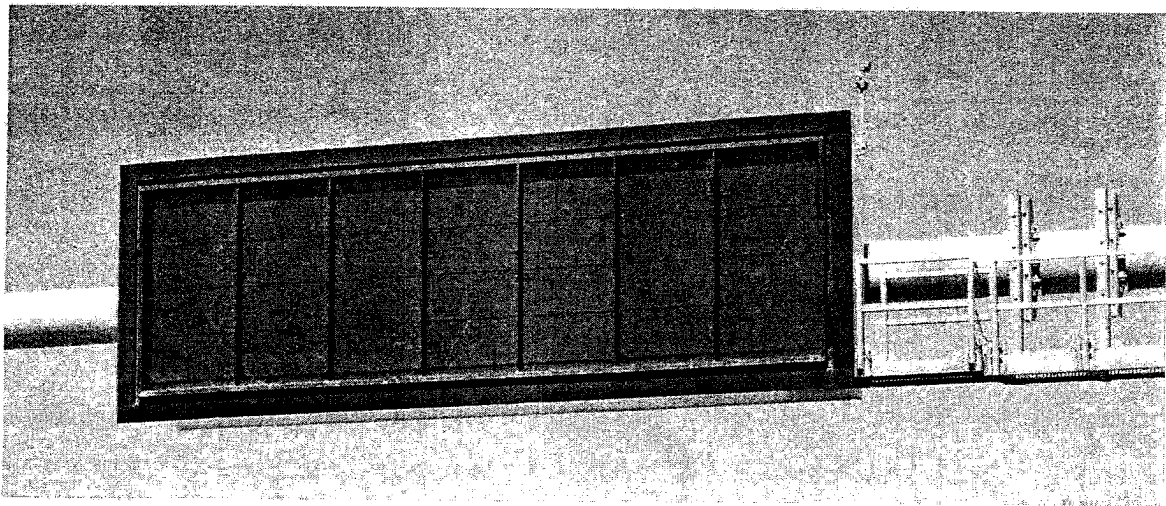
Devices in cabinet: ethernet switch, power supply, GIDI, Controller, SW, GFI, Heater.

Electrical Power Supply: singal fas 120 - 240 VAC, 30 amp c/3.

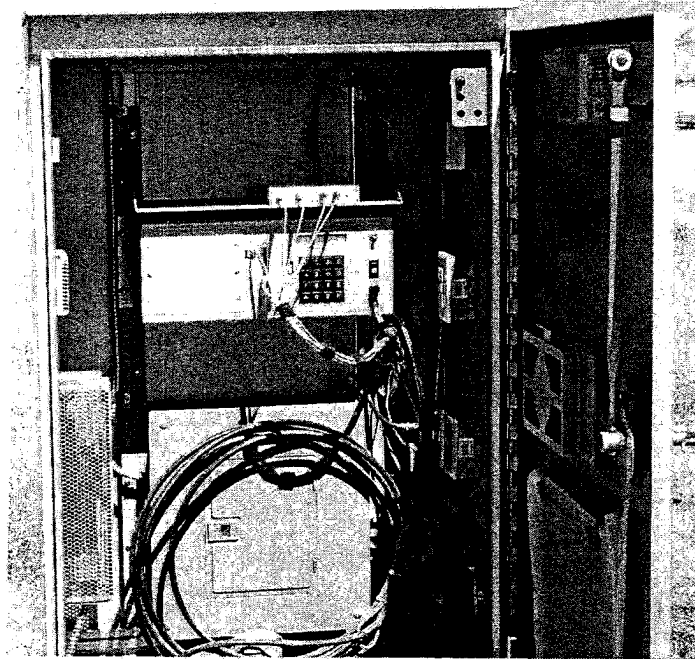
Communication: two wire communication Type CM 22 AWSD w/shields, fiber optic cable.



Inside DMS Housing



Outside DMS Housing



Inside Controller Cabinet with Controller

Section 3: LED TECHNOLOGY

(a) Amber LED Type Pixel

All overhead DMS LED pixels will consist of eight Agilent HLMP-DL51 Amber T-1 3/4 package LEDs. These LEDs will comply with total pixel and 8,000 Cd/m² brightness requirements. These LEDs have a 15 degree viewing angle and have a typical color spec of 592 nm. The cluster spacing will match the existing display being replaced.

(c) LED Module Mounting

The pixels shall be protected from the front with an aluminum panel that is part of the module. The aluminum panel will have openings that act as the pixel openings for the LED clusters. The LED modules will be mounted to the existing rail system. The LED housing design will ensure the protection of the internal wiring and components from environmental damage.

Section 4: OVERHEAD FREEWAY DMS DISPLAY

(a) Display Sign Face

The Retrofit DMS provided will be a full matrix display consisting of 105 LED pixels across by 28 LED pixels high. All display pixel modules will be interchangeable within the sign. The pixel pitch and character height will match the current display.

The DMS sign face is formed using multiple display panels, each panel representing a matrix of 15 pixels wide by 7 pixels tall. These display panels are

mounted next to each other to form the entire active display area of the DMS. All display panels are mechanically, electrically and optically interchangeable within the sign.

The DMS provided is capable of displaying ASCII characters 32 through 126. Control of different character fonts including compressed, expanded or double-stroke characters along with control of character spacing are available.

(b) LED Display Panels

The display panels consist of an aluminum structure with openings aligned with each LED pixel. The openings are sized so they do not block any portion of the LED-viewing cone. The display panel will be Powder Coated flat black to maximize contrast and longevity. The aluminum face has a minimum thickness of 0.060".

Display modules will be mounted with durable, non-corrosive hardware into each display panel, forming a building block matrix of 15 pixels wide by 7 pixels tall. A total of 28 display panels (7 panels wide by 4 panels tall) will be used to retrofit the DMS.

Once installed into the cabinet, the individual display modules will be individually removable from the display panel.

(c) LED Display modules

All display modules are mechanically, electrically and optically interchangeable within the sign.

The display modules are rectangular, and have the same horizontal and vertical pitch. The pixel pitch between modules is consistent with the pixel pitch within the modules.

Each LED display module consists of a matrix of 15 pixels horizontally by 7 pixels vertically.

Each display module is mounted with durable, non-corrosive hardware to the DMS aluminum display panel from the inside. These fasteners do not require the use of specialized tools during servicing.

All LED display module electrical and signal connections are made with quick-disconnect locking type connectors.

The DMS functions so that if any display module is removed or has failed, it will not detract from the structural integrity of the sign nor affect the performance of any other module of the sign. At initial DMS power-up, a failed display module will not impact the ability for the controller to communicate properly to the functional display modules.

Display Modules can be interchanged within a sign without any changes in dipswitch settings. The modules are assigned an address as part of the wiring harness.

All display modules have conformal coating applied as part of the sub-assembly process.

Each display modules consists of a Pixel board and a Drive Card. The Drive Card is a separate, removable daughterboard, which controls each display module. The daughterboard attaches directly to the back of each LED display module. Each display modules has a dedicated daughterboard to minimize the use of ribbon cables.

(c.1) Drive Card

LED pixels provided are directly driven with current not exceeding 25mA. The drive method varies the current pulse width in order to achieve the proper display intensity level for a given ambient light condition. The drive current pulse is modulated from a 10 millisecond period, and pulse amplitude is not allowed to exceed 25 mA per LED string. For example, the maximum current draw for a single two-string pixel won't exceed 50 mA.

Voltage to the drive card is stepped down and regulated on the card in order to lower the voltage on the constant current drivers, dissipating less power and generating less heat.

Surge protection is installed on power and communication interfaces for each drive card.

A diagnostic indicator is included on each drive card. This diagnostic indicator is in the form of four LED's. These LED's provide visual indication of the operational status of the LED module. At a minimum, this indicates failed pixel, supply voltage, operational processor, and failed communications conditions.

Data is received from the sign controller detailing the pixel pattern to illuminate. If communications ceases for a period longer than 10 seconds, the display module will be blanked.

LED drive circuitry supports a minimum refresh rate of 100 frames per second and is able to support 255 intensity levels.

Removal or failure of a single drive card does not affect the performance of any LED display module in the overhead freeway DMS, except the module that it drives.

All drive cards provided are identical and interchangeable throughout the DMS.

(c.2) LED Pixel Boards

The LED pixel board consists only of LEDs. No driver circuitry is allowed. All LED's are individually and directly flush-mounted to the LED pixel board. No standoffs or plastic alignment device(s) is used. The LED pixel board printed circuit material is 0.062", FR-4 fiberglass, flat black printed circuit board. Each LED cathode lead is soldered to a large copper PCB pad with a minimum surface area of 0.04in². The pads are on both the front and back of the circuit board. The printed circuit board copper is 2 oz. Through-holes shall be plated with 1 oz. of copper.

Each individual pixel consists of 8 LEDs, driven in two separate strings. Failure of an LED in either string does not impact the ability to control the other string of the same pixel.

The LED pixel boards are identical and interchangeable. The pixel consists of Agilent HLMP-DL51 Amber T-1 3/4 package LEDs. These LEDs have a 15 degree viewing angle and have a typical color spec of 592 nm or spec for full color pixel, with a minimum intensity of 4cd per LED.

The 18-inch characters formed by the "on" pixels are readable from any point on the approach roadway up to 900 feet away under all weather and lighting conditions.

Pixels and modules have no visible differences in illumination between them.

Each cluster and all materials are rated for outdoor usage and sunlight exposure where applicable over the environmental range expected. Each pixel is rated for 100,000 hours of field operation without serious degradation.

Section 5: ENVIRONMENT

(a) Outside Environment

Housing will not require any modification to accept the LED display.

(b) Inside Environment

Current internal ventilation system will be preserved.

Section 6: MAINTENANCE ACCESS

No change to the maintenance access is required to accept the LED displays.

Section 7: Photocell SYSTEM

If existing light and temperature systems are not compatible with the bidders system then the systems will be updated with new components. If the light and temperature systems are replaces the new components shall be modified in a manor so that they can be maintained from inside the DMS housing.

Sensors that measure outdoor ambient light levels at the DMS site, as well as the indoor ambient temperature, are mounted within the overhead freeway DMS housing walls. System consists of three (3) photoelectric sensors and one (1) temperature sensor, which provides outdoors-ambient lighting levels. Two of the photo sensors are placed such that they measure the ambient light levels striking the front and rear housing walls. The third photo sensor is mounted to the housing top and faces up. An ambient temperature sensor is mounted inside the sign housing. The sensor is placed such that it measures the internal ambient air temperature and reports that back to the sign controller.

The DMS master periodically (typically 3-5 minutes) uploads the three-photocell readings. Based on these photocell readings, the DMS master makes a determination of the appropriate sign intensity level. This intensity level is then downloaded to the sign controller, where the controller shall adjust the sign brightness appropriately. The download intensity level does not affect or cause a "blanked" DMS to energize its lamps. The lamps of "blanked" DMS remains off until a message is displayed on the overhead DMS. The sign intensity may also be manually set from the DMS controller. An algorithm is used to assign the ambient light readings range to a specific display module intensity ranging from 1 to 7.

Section 8: SIGN CONTROLLER

Each DMS is provided with an F&P proprietary controller. See photo of controller in Section 2 DMS Housing and Controller Cabinet. The controller is a stand-alone microprocessor-based computer that runs on an embedded operating system. If the bidders software will operate on this controller, a new controller may not be required.

Controller and software shall be fully compliant with NTCIP standards and with the NTCIP Class B (PMPP) communications profile. Controller and software is fully compliant with the NTCIP Class D dial-up (PPP) communications profile.

The controller is mounted in the current ground cabinet.

The sign controller shall incorporate a watchdog timer to detect an out-of-program condition and reset the microprocessor. Controller is designed for fail-safe prevention of improper information display in the case of malfunction. At a minimum, this includes an automatic blanking feature, which immediately clears the message displayed on the sign in the event of a communication failure or invalid transmission from the overhead freeway DMS master, or power failure. The controller will have a day light saving timing feature.

Controller contains diagnostic routines capable of testing full sign operations. Controller performs all messaging operations, including but not limited to flashing on and off, inverse character display on and off, horizontal tab, vertical tab, sequencing, all pixels on function, checkerboard, and inverse checkerboard.

Controller operates throughout a temperature range of -40 degrees to +176 degrees F and a humidity range of 0 to 99%.

The controller contains both permanent and changeable memory. Permanent memory shall be in the form of flash-PROM integrated circuits that contain the executable field controller software. Memory can be upgraded if new versions are available in the future. Overhead freeway DMS controller includes sufficient EPROM memory to store a minimum of 100 messages, in the format specified, for immediate display upon command from the DMS master or local control. Changeable memory shall be in the form of RAM integrated circuits. RAM circuits shall be backed-up by a lithium battery and shall retain their data memory for a minimum of one year following power failure. RAM memory shall be used for storage of message libraries, the message display schedule, programmable operating parameters, downloading and uploading messages. Memory shall store all configuration parameters in non-volatile memory and is not affected by complete loss of power at any point in its operation.

The Controller contains two EIA/TIA-232E communication ports and an Ethernet port. One port is for remote communications via a dial-up modem (PPP) or direct (PMPP) connection with the system control computer. One port is for local, direct communications with a laptop computer. Data transmission baud rates shall be in range of 9600 bits per second. All ports are active at all times. Communication from either local or central ports will be accepted and processed appropriately at any time.

Unit addressing supports dip switch selectable addressing and programmable IP addressing.

The controller supports both manual and automatic dimming levels.

The controller is capable of full display updates at the rate of 10 frames per second

Section 9: SIGN TO CABINET INTERCONNECT

Will use existing cabling between the sign and the sign controller cabinet.

Section 10: ELECTRICAL

A means shall be provided to operate the sign from the inside the DMS housing, and from the controller and remotely. No other changes to the electrical systems are required to accept the LED displays.

Section 11 NTCIP Requirements

This portion of the specification defines the detailed NTCIP requirements for the DMS.

A. Definitions

The following terms shall apply within the scope of this specification:

DMS – A Dynamic Message Sign, includes the sign display, controller, cabinet, and other associated field equipment.

FSORS – Full Standardized Object Range Support.

Full Standardized object Range Support – Support for, and proper implementation of all valid values of an object as defined within the object's OBJECT_TYPE macro in the NTCIP standard; this is defined in two distinct sub-requirements. (1) If ACCESS of the object is read-write, a Management System shall be able to set the object to any valid value as defined by SYNTAX and DESCRIPTION fields (except that the value of 'other' need not be supported when such a value is defined) and the indicated functionality shall be provided. (2) The value indicated by the object (e.g. in response to a get), regardless of the access shall reflect the current conditions per the rules specified in the object's DESCRIPTION.

Management System – A computer system used to control an NTCIP component. This includes any laptop software used for field control as well as the central software.

NTCIP Component – A DMS or management system.

NTCIP System – A management plus the various ASCs and DMSs controlled by the management system.

Response Time – The time to prepare and begin transmission of a complete response containing the requested application layer information. This is measured as the time from receipt of the closing flag of the request to the transmission of the opening flag of the response when the device has immediate access to transmit.

NTCIP Acronyms

AASHTO - American Association of State Highway and Transportation Officials
FSK - Frequency Shift Key
IP - Internet Protocol
NEMA - National Electrical Manufacturers Association
NTCIP - National Transportation Communications for ITS Protocol
PMPP - Point-to-Multi-Point Protocol
PPP - Point-to-Point Protocol
UDP - User Datagram Protocol

B. References.

This specification references several standards through their abbreviated names. Each DMS component shall support the most recent version of these standards, including all Recommended or Approved Amendments, currently in effect. The most recent versions of these standards and known Amendments are shown below. In many cases, the standards are more widely known by its original NEMA assigned number; in these cases the NEMA number is also identified. The content of the NEMA standard is identical to the NTCIP standard. It is the ultimate responsibility of the Manufacturer to monitor NTCIP actives to discover any recent documents.

Table 1: NTCIP Standards

Abbreviated Number	Full Number	Title	Known Amendments
NTCIP 1101	NTCIP 1101:1997 (NEMA TS 3.2-1996)	Simple Transportation Management Framework	Amendment #1 Dated November 2, 1998
NTCIP 1201	NTCIP 1201:1997 (NEMA TS 3.4-1996)	Global Object Definitions	Amendment #1 Dated November 2, 1998
NTCIP 1203	NTCIP 1203:1997 (NEMA TS 3.6-1997)	Object Definitions for Dynamic Message Signs	
NTCIP 2001	NTCIP 2001: 2000 (NEMA TS-3.3)	Class B Profile	Amendment #1 Dated Unknown
NTCIP 2101	NTCIP 2101: 2000 (NEMA TS 3.PMP232-2000)	Subnet Profile for PMPP over RS-232	
NTCIP 2102	NTCIP 2102V01.03: (Draft)	Point-to Point Protocol using RS 232 Subnetwork Profile	
NTCIP 2104	NTCIP 2104 v01.10	National Transportation Communications for ITS Protocol Ethernet Subnetwork Profile	
NTCIP 2201	NTCIP 2201	Transportation Profile	
NTCIP 2301	NTCIP 2301: 2000 (NEMA TS 3.STMF)	Application Profile	

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NTCIP 2001	NTCIP 2001: 2000 (NEMA TS-3.3)	Class B Profile	Amendment #1 Dated Unknown
NTCIP 2101	NTCIP 2101: 2000 (NEMA TS 3.PMP232-2000)	Subnet Profile for PMPP over RS-232	
NTCIP 2102	NTCIP 2102V01.03: (Draft)	Point-to Point Protocol using RS 232 Subnetwork Profile	
NTCIP 2104	NTCIP 2104 v01.10	National Transportation Communications for ITS Protocol Ethernet Subnetwork Profile	
NTCIP 2201	NTCIP 2201	Transportation Profile	
NTCIP 2301	NTCIP 2301: 2000 (NEMA TS 3.STMF)	Application Profile	

C. General Requirements

1. Subnet Level

Each serial port on each NTCIP Component shall support NTCIP 2102 over a dial-up connection with a external modem with data rates of 28.8 kbps, 19.2 kbps, 14.4 kbps, 9600 bps, 2400bps, 1200 bps, 600 bps and 300bps. The NTCIP Component shall be capable to make outgoing and receive incoming calls as necessary and support the following modem command sets:

- Hayes AT – Command Set
- MNP5
- MNP10
- V.42bis

Each serial port on each NTCIP Component shall support NTCIP 2102 over a null-modem connection with data rates of 19.2 kbps, 14.4 kbps, 9600 bps, 4800 bps, 2400 bps, 1200 bps, 600 bps and 300 bps.

Each serial port on each NTCIP Component shall support NTCIP 2101 with data rates of 9600 bps, 4800 bps, 2400 bps, 1200 bps, 600 bps and 300 bps.

NTCIP Components may support additional Subnet Profiles at the Manufacturer's option. At any one time, only one Subnet Profile shall be active on a given serial port of the NTCIP Component. The NTCIP Component shall be configurable to allow the field technician to activate the desired Subnet Profile and shall provide a visual indication of the currently selected Subnet Profile.

2. Transport Level

Each NTCIP Component shall comply with NTCIP 2201 The transport layer shall be a NULL layer.

NTCIP Components may support additional Transportation Profiles at the Manufacturer's option. Response datagrams shall use the same Transport Profile used in the request. Each NTCIP Component shall support receipt of datagrams conforming to any of the identified Transport Profiles at any time.

3. Application Level

Each NTCIP Component shall comply with NTCIP 1101 and shall meet the requirements for conformance Level 1.

Each NTCIP Component shall support STMP traps.

An NTCIP Component may support additional Application Profiles at the Manufacturer's option. Responses shall use the same Application Profile used by the request. Each NTCIP Component shall support the receipt of the Application data packets at any time allowed by the subject standards.

4. Information Level

Each NTCIP Component shall provide full Standardized Object Range Support of all objects required by this specification unless otherwise indicated below. The maximum response time for any object shall be 200 milliseconds.

The DMS shall support all mandatory objects of all Conformance Groups as defined in NTCIP 1201 and NTCIP 1203. Table 2 indicated the modified object requirements of these mandatory objects.

Table 2: Modified Object Ranges for Mandatory Objects

Object	Reference	Project Requirement
Module Table Entry	NTCIP 1201 Clause 2.2.3	Shall contain at least one row with module Type equal to 3 (software). The module make shall specify the name of the Manufacturer, the module model shall specify the Manufacturer's name of the component and the model version shall indicate the model version number of the component
Max Group Address	NTCIP 1201 Clause 2.7.1	Shall be at least 1
Community Name Address	NTCIP 1201 Clause 2.8.2	Shall be at least 3

Table 2: Modified Object Ranges for Mandatory Objects (continued)

Object	Reference	Project Requirement
DMS Num Permanent Msg	NTCIP 1203 Clause 2.6.1.1.1.1	Shall be at least 1*
DMS changeable Msg	NTCIP 1203 Clause 2.6.1.1.1.3	Shall be at least 21
dms Free Changeable Memory	NTCIP 1203 Clause 2.6.1.1.1.4	Shall be at least 20 when no message is stored
dms Message Multi String	NTCIP 1203 Clause 2.6.1.1.1.8.3	The DMS shall support any valid MULTI string containing any subset of those MULTI tags listed in table 4
dms Control Mode	NTCIP 1203 Clause 2.7.1.1.1.1	The DMS shall support any valid MULTI string containing any subset of those MULTI tags listed in Table 4.

* The Permanent Messages shall display the content shown in Table 3.

Table 3: Content of Permanent Messages

Perm. Msg. Num.	Description
1	Permanent Message #1 shall blank the display (ie. consist of an empty MULTI string). It shall have a run-time priority of one (1),

Table 4: Required Multi Tags

Code	Feature
f1	field 1 – time (12hr)
f2	field 2 – time (24hr)
f8	field 8 - day of month
f9	field 9 – month
f10	field 10 – 2 digit year
f11	field 11 – 4 digit year
fl (and/ft)	flashing text on a line by line basis with flash rates controllable in 0.1 second increments
fo	Font
jl2	justification – line- left
jl3	justification – line-center
jl4	justification – line-right
jl5	justification – line-full
jp2	justification – page – top
jp3	justification – page –middle
jp4	justification – page –bottom
mv	moving text
nl	new line
np	new page, up to 2 instances in a message (ie., up to 3 pages/frames in a message counting first page)
pt	page times controllable in 0.1 second increments

The NTCIP Component shall also implement all mandatory objects of the following optional conformance groups.

- (a) Time Management, as defined in NTCIP 1201
- (b) Timebase Event Schedule, as defined in NTCIP 1201.

The following list indicates the modified object requirements of the conformance group.

Table 5: Modified Object Ranges for the Time base Event Schedule Conformance Group

Object	Reference:	Project Requirements
max time base schedule entries	NTCIP 1201 clause 2.4.3.1	Shall be at least 28
max day plans	NTCIP 1201 clause 2.4.4.1	Shall be at least 20
max day plan events	NTCIP 1201 clause 2.4.4.2	Shall be at least 10

- (c) Report, as defined in NTCIP 1201.
- (d) PMPP
- (e) The following list indicates the modified object requirements for this conformance group.

Table 6: Modified Object Ranges for the Report Conformance Group

Object	Reference	Project Requirements
max event log configs	NTCIP 1201 Clause 2.5.1	Shall be at least 50
Event configuration Mode	NTCIP 1201 Clause 2.4.3.1	The NTCIP Component shall support the following event configuration: on change greater than value smaller than value
Max event log size	NTCIP 1201 Clause 2.5.3	Shall be at least 200
Max event classes	NTCIP 1201 Clause 2.5.5	Shall be at least 7

- (f) Font Configuration, as defined in the NTCIP 1203.

The following list indicated the modified object requirements for this conformance group.

Table 7: Modified Object Ranges for the Font Configuration Conformance Group

Object	Reference	Project Requirements
num Fonts	NTCIP 1203 Clause 2.4.1.1.1.1	Shall be at least 8
max Font Characters	NTCIP 1203 Clause 2.4.1.1.1.3	Shall be at least 255

Upon delivery, the first font shall be a standard 12-inch font, as described in the DMS special Provision. The second font shall be a double-stroke 12-inch. The third font shall be a 19.8-inch font.

Upon delivery, the first three font sets shall be configured in accordance with ASCII character set for the following characters:

- “A” thru “Z” – in both upper and lower cases
- “0” thru “9” – all decimal digits
- A blank or space
- Eight (8) directional arrows

- Punctuation marks, such as . , ! ? - ‘ ”
- Other characters, such as # & * / () [] < >

(g) DMS configuration, as defined in NTCIP 1203

(h) Multi Configuration, as defined in the NTCIP 1203.

The following list indicates the modified object requirements for this conformance group.

Table 8: Modified Object Ranges for the MULTI Configuration Conformance Group

Object	Reference	Project Requirement
default Background color	NTCIP 1203 Clause 2.5.1.1.1.1	The DMS shall support the following background colors: black
default foreground color	NTCIP 1203 Clause 2.5.1.1.1.2	The DMS shall support the following foreground colors: <ul style="list-style-type: none"> • Amber
Default flash on	NTCIP 1203 Clause 2.5.1.1.1.3	The DMS shall support the full range of these objects.
Default flash off	NTCIP 1203 Clause 2.5.1.1.1.4	The DMS shall support the full range of these objects.
default justification line	NTCIP 1203 Clause 2.5.1.1.1.6	The DMS shall support the following forms of line justification: <ul style="list-style-type: none"> • left • center • right
default justification page	NTCIP 1203 Clause 2.5.1.1.1.7	The DMS shall support the following forms of page justification: <ul style="list-style-type: none"> • top • middle • bottom
default page on time	NTCIP 1203 Clause 2.5.1.1.1.8	The DMS shall support the full range of these objects with step sizes no larger than 0.5 seconds
default page off time	NTCIP 1203 Clause 2.5.1.1.1.9	The DMS shall support the full range of these objects with step sizes no larger than 0.5 seconds
default character set	NTCIP 1203 Clause 2.5.1.1.1.10	The DMS shall support the following character sets: eight bit

(i) Multi Error Configuration, as defined in NTCIP 1203

(j) Illumination/Brightness Control, as defined in NTCIP 1203.

The following list indicates the modified object requirements for the conformance group.

Table 9: Modified Object Ranges for Illumination/Brightness Control Conformance Group

Object	Reference	Project Requirement
dms illum control	NTCIP 1203 Clause 2.8.1.1.1.1	The DMS shall support the following illumination control modes: photocell timer manual
Dms illum num bright levels	NTCIP 1203 Clause 2.8.1.1.1.4	Shall be at least 16

- (k) Scheduling as defined in the NTCIP 1203. The following text indicates the modified object requirements for this conformance group.

Table 10: Modified Object Ranges for Scheduling Conformance Group

Object	Reference:	Project Requirement
num action table entries	NTCIP 1203 Clause 2.9.1.1.1.1	Shall be at least 200

- (l) Sign Status, as defined in NTCIP 1203
- (m) Status Error, as defined in NTCIP 1203
- (n) Pixel Error Status, as defined in NTCIP 1203
- (o) Power Status, as defined in the NTCIP 1203

The NTCIP Component shall also implement the following optional objects:

Table 11: Optional Object Requirements

Object	Reference	Project Requirement
global set ID parameter	NTCIP 1201 Clause 2.2.1	FSORS
event config log OID	NTCIP 1201 Clause 2.5.4.7	FSORS
event config action	NTCIP 1201 Clause 2.5.4.8	FSORS
event class description	NTCIP 1201 Clause 2.5.6.4	FSORS
default flash on	NTCIP 1203 Clause 2.5.1.1.1.3	The DMS shall support the full range of these objects with step size no larger than 0.5 seconds
default flash off	NTCIP 1203 Clause 2.5.1.1.1.4	The DMS shall support the full range of these objects with step size no larger than 0.5 seconds
dms SW reset	NTCIP 1203 Clause 2.7.1.1.1.2	FSORS
dms message time remaining	NTCIP 1203 Clause 2.7.1.1.1.4	FSORS
dms short power recovery message	NTCIP 1203 Clause 2.7.1.1.1.8	FSORS
dms long power recovery message	NTCIP 1203 Clause 2.7.1.1.1.9	FSORS
dms short power loss time	NTCIP 1203 Clause 2.7.1.1.1.10	FSORS
dms reset message	NTCIP 1203 Clause 2.7.1.1.1.11	FSORS
dms communication loss message	NTCIP 1203 Clause 2.7.1.1.1.12	FSORS

Table 11: Optional Object Requirements (continued)

dms time comm. Loss	NTCIP 1203 Clause 2.7.1.1.1.13	FSORS
dms end duration message	NTCIP 1203 Clause 2.7.1.1.1.15	FSORS
dms memory mgmt	NTCIP 1203 Clause 2.7.1.1.1.16	The DMS shall support the following Memory Management Modes: clear changeable messages clear volatile messages
dms multi other error description	NTCIP 1203 Clause 2.7.1.1.1.20	If the contractor implements any contractor-specific MUTI tags, the DMS shall provide meaningful error messages with in the object whenever one of these tags generates an error.
dms illum light output status	NTCIP 1203 Clause 2.8.1.1.1.9	FSORS
watchdog failure count	NTCIP 1203 Clause 2.11.1.1.1.5	FSORS
dms stat door open	NTCIP 1203 Clause 2.11.1.1.1.6	FSORS
fan failure	NTCIP 1203 Clause 2.11.1.1.1.8	FSORS
fan test activation	NTCIP 1203 Clause 2.11.1.1.1.9	FSORS
temp min ctrl cabinet	NTCIP 1203 Clause 2.11.4.1.1.1	FSORS
temp max ctrl cabinet	NTCIP 1203 Clause 2.11.4.1.1.2	FSORS
temp min sign housing	NTCIP 1203 Clause 2.11.4.1.1.5	FSORS
temp max sign housing	NTCIP 1203 Clause 2.11.4.1.1.6	FSORS

Section 12 Spare Parts

12.1 Manufacturer shall provide a percent discount off list price for other related items (spare parts).

12.2 Spare parts to be provided under this contract, when ordered by the STATE, shall be supplied in separate cartons for each subassembly or assembly. Only complete assemblies or subassemblies shall be packed in each shipping carton.

12.3 All cartons shall be clearly marked on the outside with the part number, serial number, purchase order number, and the manufacturer's name and shipping address. The shipping address shall contain "Attention: (person placing the order or person assigned to receive shipments)".

12.6 The unit of each complete spare part, including packaging and shipping; and paid by the unit price for the spare part.

12.7 A spare LED display module is to be included with each sign and furnished as part of the contract unit price.

12.8 Delivery time for spare parts will be a maximum of 30 days

Section 13 Acceptance Tests

The CONTRACTOR shall provide a complete Proof of Performance Test Plan submission for approval by the Department Project Manager.

13 The Proof of Performance Testing will be used to verify compliance with the Specifications. Perform the following functional testing using the UDOT approved testing software:

- 13.1 Demonstrate 100% compliance with NTCIP protocol stack operating within an automated poll-response environment.
- 13.2 Demonstrate every feature of the DMS controller and sign display assembly via direct connect and modem communications.
- 13.3 Demonstrate fault-free operations of the DMS assembly under test when subject to 500 cycles of status request command and response operations between the DMS and the test software.
 - 13.3.2 Demonstrate fault-free operation of the DMS assembly under test when subjected to 1000 cycles of message download command, message download response, message display command, message display response, CMS status command, and DMS status response. Perform one complete cycle in 20 seconds or less with a DMS message constructed such that a character message fills every available character space on a two-phase message. Set the phase time on to three seconds for each phase and the off time to zero seconds.
 - 13.3.3 Demonstrate that the DMS always recovers properly following disruption on the communications line and power interruptions occurring at any time during the communications processes. The test software shall be used to verify that memory contents are not corrupted during power outages and that communications faults do not cause the sign to reset, halt, or otherwise require field intervention for recovery.
 - 13.3.4 Record all communications between the test software and the DMS under test using a protocol analyzer. Record serial data captured by the protocol analyzer on media printable from the protocol analyzer to an ANSI character printer. Provide test results to UDOT as part of the Proof of Performance test results.

The CONTRACTOR shall request a Proof of Performance Test in writing a minimum of 15 calendar days in advance of that test session. The CONTRACTOR shall permit the Department to adjust the proposed schedule of the Proof of Performance Test by up to seven (7) calendar days at no cost to the DEPARTMENT to allow for availability of DEPARTMENT representatives. The Proof of Performance Testing session shall be completed within five (5) consecutive working days unless otherwise approved by the Department

13.4 Burn-In Period for Variable Message Sign Installations

General Requirements: A 30-day burn-in period will be required for all work and equipment included in the CONTRACT. The burn-in period shall consist of the field operation of the DMS system in a manner that is in full accordance with the DMS system requirements described above. An acceptance test procedure is not required for the system burn-in.

- 13.2.1 The burn-in period shall commence only after all of the following requirements have been met:

- 13.4.2 All work required in all CONTRACT DOCUMENTS (except this burn-in period) is completed;
 - 13.4.3 All System Conditional Acceptance is successfully completed;
 - 13.4.4 All equipment and materials furnished and installed as part of the CONTRACT are functioning properly;
 - 13.4.5 DMS Retrofit Equipment has been installed and made operational in the field Installation work may be done by the contractor or UDOT.
- 13.5 The DEPARTMENT will commence this burn-in period after final installation of the DMS Retrofit Equipment is complete, and will terminate 30 consecutive days thereafter unless an equipment malfunction occurs. The burn-in period will be stopped for the length of time any equipment is defective. When the equipment is repaired and functions properly, the burn-in period will continue from the point it was stopped. However, if the malfunction has not been corrected within 72 hours from notification to the CONTRACTOR, then the observation period shall be restarted from the beginning.
- 13.6 Notification shall be deemed to have occurred whenever DEPARTMENT Project Manager shall provide a verbal notification to the CONTRACTOR. Note further that if the failure is due to a design defect (hardware or software) of the sign, the test shall be restarted only after the defect has been corrected. All signs shall be updated with the correction and the testing of the entire system shall be restarted.
- 13.7 Successful completion and acceptance of the burn-in period will be granted on the 30th day unless:
- 13.7.1 Any equipment is malfunctioning on the 30th day, in which event final acceptance will be withheld until repair is completed and all equipment is functioning properly for 30 calendar days after repair.
 - 13.7.2 Any equipment has malfunctioned during the 20th through 29th day of the burn-in period, in which event final acceptance will be withheld until all the equipment is functioning properly for 30 days after repair.
- 13.8 When a specific piece of equipment has malfunctioned more than three times during the 30 day burn-in period, the CONTRACTOR shall replace that equipment with a new unit and the burn-in shall restart for that sign.
- 13.9 The Department Project Manager shall maintain records of equipment malfunctions. The CONTRACTOR shall furnish written reports to the Department Project Manager noting all failures reported, the date and

time of the report, the affected systems or subsystems, and a detailed report of all components used to repair the problem. Repairs shall be documented in a manner which notes the exact procedures used to determine the cause of the problem, all components used for repair, and all testing performed to verify that all necessary repairs have restored the equipment to full operation.

13.10 The Department project Manager shall review the operation and maintenance history of the signs during the burn-in period. If analysis of the failures indicates that there is a design defect in the DMS Retrofit Equipment, then the 30 day burn-in period shall be halted until such time as the CONTRACTOR corrects the problem for all DMS Retrofit Equipment. The 30 day burn-in shall then be restarted from the beginning. During any suspension, the contractor shall be responsible for continuing operation and maintenance of the DMS Retrofit Equipment as noted below, even though the burn-in period has been suspended. Use of the DMS Retrofit Equipment by the DEPARTMENT during this period shall not be construed as acceptance of the DMS.

13.11 *CONTRACTOR Responsibilities.* During the burn-in period, the CONTRACTOR shall be responsible for the maintenance of all work under this CONTRACT. Failure to restore any work or equipment to proper operating condition within seventy-two (72) hours after notification shall constitute default by the CONTRACTOR.

13.12 *DEPARTMENT Responsibilities.* DEPARTMENT responsibilities during the burn-in period shall be as follows:

13.10.1 Arrangements for DMS Retrofit Equipment field installation within 30 days of delivery and in accordance with the sign manufacturers specifications.

13.12.2 Expeditious notification of CONTRACTOR upon failure or malfunction of equipment.

13.12.3 Repair or replacement of any part of the installation damaged as a result of natural causes and those resulting from events outside control of the CONTRACTOR.

13.11 Final Acceptance

Final acceptance of the CONTRACT will be made after satisfactory completion of the required burn-in period and on the basis of a comprehensive final construction inspection of the entire DMS subsystem.

Payment Schedule

The payment schedule the retrofit equipment shall be as follows:

Price Bid Items 1,2 – 80 % on turn on
Remaining 20 % after 30 day burn in

Price Bid Items 3,5,7 – On receipt of equipment

Price Bid Items 4,6,8 – 80 % on turn on
Remaining 20 % after 30 day burn in.

Section 14 Engineering Services

- 14.1 The Contractor shall provide the services of a qualified engineer/technician on site for the purpose of assisting STATE in troubleshooting problems with the sign or the integrated system. Such services may include but not be limited to system troubleshooting, communications troubleshooting, system integration support, and sign troubleshooting. The contractor shall submit the name and qualifications of the person that will be providing such services for review and approval prior to the start of any such work. The rate quoted for this service is measured in calendar days and for all costs including but not limited to living expenses, local transportation, airfares, travel time, labor, telephone, and all other incidental expenses. For the basis of estimating these costs, STATE will contract for 2 days at a time. The time paid shall be for a minimum of 8 hours per day actively assisting STATE on site [i.e. travel time is not included in the 8 hours).
- 14.2 It is recognized that it is often difficult to determine the exact cause of a problem, and hence this line item is available for STATE to contract for engineering services to assist in resolving different types of problems. However, if the cause of the problem is the direct result of a design defect in the sign, its internal software, and/or documentation, all costs including labor shall be the responsibility of the contractor/contractor and STATE will not reimburse the contractor for either the time or expenses. STATE shall determine if such charges are the result of contractor/contractor defects and shall submit written resolution immediately following the conclusion of the engagement.
- 14.3 STATE shall provide the contractor of the need for such services and the contractor shall be available to report to STATE at 8:00 AM on-site within 72 hours of such notification. Failure to report to the job site within the 72 hours allowed or such other time as determined by STATE (but not less than 72 hours) shall result in the assessment of late fees in the amount of \$1000 per day until such time as the approved engineer/technician is available on-site. A late fee will not be assessed if circumstance beyond the control of the contractor prevent the engineer/technician from arriving on time.
- 14.4 Payment will be made on the basis of calendar days spent on-site for each engagement. Such engagements may be extended on a day-by-day basis at the option of STATE until the problem is resolved.

Section 15 General Warranty Provisions:

15.1 General

The warranty period begins at *final acceptance*. The ten-year warranty period consists of a one year full-warranty and an additional four-year warranty on equipment and an additional five year warranty on LED panel.

15.1.1 One-year full warranty on labor

The terms of the LED guaranties shall stipulate that the LED Retrofit manufacturer is fully responsible for all parts, labor, diagnosis, removal, shipping, handling, and reinstallation for the repair or replacement of any malfunctioning, failed, problematic, or otherwise unacceptable LED equipment. The terms of the LED equipment and materials guaranties and full warranty shall be in effect for one calendar year after final acceptance.

15.1.2 Five-year warranty on all parts, except as in section 15.1.3

The terms of the LED equipment and materials guaranties shall stipulate that the LED Retrofit manufacturer is fully responsible for all parts, diagnosis, shipping, and handling, for the replacement of any malfunctioning, failed, problematic, or otherwise unacceptable LED equipment. The STATE will provide labor to remove and reinstall the equipment at no cost to the Contractor. The terms of the LED equipment and materials guaranties and equipment warranty shall be in effect four calendar years after the full warranty period has ended.

15.1.3 Ten-year warranty on LED's and LED Panels

The terms of the LED panels and materials guaranties shall stipulate that the LED retrofit manufacturer is fully responsible for all parts, diagnosis, shipping, and handling, for the replacement of any malfunctioning, failed, problematic, or otherwise unacceptable LED panel. The STATE will provide labor to remove and reinstall the panel at no cost to the Contractor. The terms of the LED panel and materials guaranties and equipment warranty shall be in effect ten calendar years after the equipment warranty period has ended.

- 15.1.4 Any component or electronic or electrical assembly or sub-assembly which experiences more than three failures during the ten-year warranty period shall be replaced with a new component, assembly or sub-assembly.
- 15.2 The shipping carton and all packing materials shall be reusable such that the containers can be used to re-ship materials for repair. Each carton shall be suitable for shipping by common carrier without special handling. All cartons shall be clearly marked on the outside with the part number, serial number, purchase order number, and the manufacturer's name and shipping address. The shipping address shall contain "Attention: (name of person placing the order or person assigned to receive shipments)".
- 15.3 Warranty turn around time shall not more than 14 working days from the time of notification.

Section 16 Training

16.0 DESCRIPTION

Work under this item shall consist of providing qualified instructors and all materials for training STATE personnel and other designated personnel in the operation and maintenance of the various equipment and components furnished under this contract. **Training in this section does not include training of State personnel for the installation of sign number 1 as stated in Price Bid 1, 3, and 7 number 6.**

16.1 TRAINING ELEMENTS

- 16.1.1 The contractor shall develop and submit training course outlines and samples of all training aids and manuals to the engineer for approval at least fourteen (14) days prior to the proposed schedule start of the training sessions. Written approval of this material shall be required prior to the final scheduling of the training sessions or the final production of the training materials. Training shall not begin until after approval of the submitted training material, and the detailed schematic drawings and maintenance manuals.
- 16.1.2 The training sessions described under this item shall include training on the use of the any test equipment that the contractor recommends.
- 16.1.3 All training sessions shall be conducted at locations within Salt Lake County, Utah or as designated by the STATE. Training sessions shall not overlap unless otherwise permitted by the STATE.

16.1.4 Training shall consist of formal classroom lectures as well as “Hands – On” training. “Hands – On” training shall consist of working with the actual equipment.

16.1.5 A training session shall consist of a total of 8 hours, with 4 hours minimum of classroom time and up to 4 hours of “hands-On training. The attendance of a session shall have no greater than 10 people to maximize individual interaction. Each session shall provide a basic understanding of the equipment and subsystems and their operation and maintenance. These training sessions shall include as appropriate, and as a minimum:

16.1.5.1 Background on concepts of equipment / subsystems and theory of operation;

16.1.5.2 Functional description of the DMS Retrofit Equipment subsystem components,

16.1.5.3 Procedures for installing and setting up equipment and components;

16.1.5.4 Basic trouble-shooting and fault determination procedures, including use of test equipment;

16.1.5.5 Preventative maintenance procedures and schedules.

Attachment B
Price list

Item	DESCRIPTION	Quantity	Unit Price	Extended Total
1	Amber LED Retrofit Equipment (Unit 1)	1	\$37,625.00	\$37,625.00
2	Additional 5 warranty for LED's and Panels (Unit 1)	1	\$2,310.00	\$2,310.00
3	Contractor installation of amber Retrofit Equipment (unit 1)	1	\$8,000.00	\$8,000.00
4	Amber LED Retrofit Equipment (Units 2 through 47)	46	\$37,625.00	\$1,730,750.00
5	Additional 5 year Warranty for LED's and Panels (Units 2 though 47)	46	\$2,310.00	\$106,260.00
6	Contractor installation of amber Retrofit Equipment (Units 2 though 47)	46	\$4,000.00	\$184,000.00
7	Engineering Services	1	\$1,733.00	\$1,733.00
8	Training Courses	3	\$1,833.00	\$5,499.00
	Total	XXXX	XXXXXX	

9	Spare Parts - Percent discount off list price, for other related items	XXXX	25%	XXXx
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**SPECIAL TERMS AND CONDITIONS
ATTACHMENT C**

1. Invoicing: CONTRACTOR shall submit invoices to the Ordering Agency and as directed by the State Purchaser.

As a minimum, the invoice shall include the name of the Vendor, the State of Utah Contract Number, the Ordering Agency Purchase Order or PG number, the invoice date, and the remittance address. Each product purchased shall be itemized, showing the number of purchased units, the unit costs, serial numbers (if applicable), and the total amount of each item. Invoices that do not meet these requirements shall not be considered responsive.

The State shall be invoiced as follows for each sign purchase:

- 1.1 1st Invoice - 80% of Purchase Price after unit has successfully install as directed in Attachment D Section 13 Acceptance Test
- 1.2 Final Invoice - 20% of Purchase Price after the unit has successfully completed the 30-Burn in Period Test and as directed Attachment 13.1 Final Acceptance. The invoice should indicate that it is a "Final Invoice" (for each purchase).

The Ordering Agency shall process invoices for payment within thirty (30) days after receipt and send via postal mail. However, the STATE, at its sole discretion and after giving the Vendor written notification, may delay payment of invoices that are disputed or that are submitted without the specified forms, reports and deliverables.

2. Final Payment: Final payment will be issued after Final Acceptance has been made as described in Attachment D Section 13 and required data have been received and accepted by the STATE Project Manager as accurate and complete.

3. Price Guarantees: All pricing must be guaranteed for the entire term of the contract. The State will be given the immediate benefit of any price reductions, or allowable discount on any of the contract items.

4. Notification: Notice given under this Contract shall be written, or sent by facsimile or other electronic means. Written notice shall be sent by registered or certified mail, postage prepaid, return receipt requested, or by any other overnight delivery service which delivers to the noticed destination and provides proof of delivery to the sender. Facsimile or other electronic notice must be followed within three (3) days by written notice.

5. Responsibility for Wages: The Contractor shall be responsible for all applicable company wages in accordance with the Federal, State and local laws and ordinances.

6. Submittal Data Requirements: The Contractor will be required to submit detailed schematic drawings and furnish maintenance manuals at the training for the installation of the LED equipment in sign number 1. Other data specified in Attachment D section 13 will be required at time of final acceptance of signs 2 through 47.

7. Assignment of Contract: The CONTRACTOR shall not sublet, assign or transfer any part of this contract without prior written approval from STATE. Neither shall the provision of monies due under this contract be assignable without prior written approval of STATE.

8. Non-Performance: If, at any time, CONTRACTOR fails to demonstrate the required expertise (as represented in the Contractor's proposal) or fails to meet acceptable standards of performance, the STATE reserves the right to require the CONTRACTOR to replace individual(s) with a competent individual(s). The STATE Project Manager must approve this replacement. If

the CONTRACTOR fails to accomplish project objectives or meet schedule commitments established in meetings with the STATE Project Manager, this contract may be canceled immediately. If the STATE elects to terminate the contract for this reason, the STATE will supersede Article 13 in Attachment A - Standard Terms and Conditions, and will not provide 60 days prior notice to the CONTRACTOR.

9. Forum for Enforcement: Any controversy or claim arising out of, in connection with, or relating to this Contract or a breach thereof shall be settled by arbitration under the arbitration rules of the American Arbitration Association, Utah Board. The arbitration proceeding shall be governed by the Statutes of the State of Utah, and the proceeding shall be held in Salt Lake City, Utah. Anything to the contrary contained in the above mentioned rules and statutes notwithstanding, the parties consent that any papers, notices, or process necessary or proper for the institution or continuance of, or relating to any arbitration proceeding, or for the confirmation of an award and entry of judgment on any award made, including appeals in connection with any judgment or award, may be served on each of the parties by registered mail addressed to the party at the principal office of the party or by personal service on the party in or without the above mentioned state. The parties hereby recognize and consent to the above mentioned arbitration association's jurisdiction over each and every one of them.

10. Disputes: Any dispute arising under this Contract, which is not resolved, by the STATE and CONTRACTOR shall be decided by a court of law under the terms of **Article 11. Forum for Enforcement.** Pending settlement of the final decision by the court, CONTRACTOR shall proceed diligently with the performance of the Contract in accordance with STATE's direction.

11. Local Warehouse and Distribution : The Contractor will be required to maintain a reasonable amount of stock warehoused in the State of Utah for immediate or emergency shipments. Shipments are to be made in the quantities as ordered by the various ordering agencies and according to acceptance procedures.

General DMS Spare Parts Price List

Adaptive		Part Description		QTY PER SIGN		List Price
Part Number	Part Description					
15091802DR	SPARE PART,SIGN CONTROLLER,NTCIP			2	\$	1,603.02
1509180101SP	SPARE PART,CONTROLLER,ETHERNET			1	\$	1,806.72
15019010SP	SP,LIGHT SENSOR,P1501,PROGRAMMED			1	\$	102.21
15019021	CABLE ASY,THIN NETWORK TERMINATOR			1	\$	30.39
1509100701SP	SP,HSNG,ADDRESS PLUG,10POS,COLOR CODED			75	\$	8.50
1509112101SP	MODULE,5x7-2.6			75	\$	399.57
40756302	SWPS,90-264-12,498W,47-63Hz/W C.COATING			2	\$	442.00
1509000601	FILTER,FAN GROUP,1SET,BACK/FLOOR			5	\$	91.42
1509101001	SWITCH,TIMER,SPST,12HR,NO HOLD			2	\$	44.74
50600003	FLOURESCENT BULB,3',45WATTS,CW, HO			2	\$	11.56
50600004	BALLAST,55W,HO,CS(-20F,2BULB			1	\$	135.12
30300002	DIODE MODULE,POWER,220A,30V,1/4in TERM			1	\$	56.06
30350014	TRANSORB,385VAC,2500A PEAK,UL/CSA/VDE			4	\$	0.28
1507100601	HUMIDITY SENSOR, 3%,OUTSIDE AIR			1	\$	422.50
30350019	SURGE PROTECTOR,2 PAIR,10KA,-40C/85C			1	\$	132.56
30670005	THERMOSTAT,CLOSE>120F,OPEN<90F			1	\$	9.10
48000007	RELAY,10A,3-32VDC,24-280VAC,SPST,NO			3	\$	68.20
48000009	RELAY,24-280VACOUT,SPST,3-32VDCIN,NO			1	\$	68.88
48008203	RELAY,90-280VACIN,SPST,3-32VDCOUT,NO			1	\$	34.20
46000026	FAN,230CFM,172x150x51mm,120V,TACH/WIRES			2	\$	37.00
1509110301	FAN MONITORING PCB ASY,AC FANS			2	\$	75.80
30670754	THERMOSTAT,OPEN >150F,CLOSE <120F			1	\$	9.10
30676014	HEATER,150W,120VAC,10-32 STUDS,1.5x8"			1	\$	40.26
30352001	SURGE ARRESTOR,DISCRETE,120VAC,M18-120			2	\$	53.50
48100006	BREAKER,QO SER LOAD CENTERS,20A,QO120,SP			2	\$	22.10
48100020	BREAKER,QO SER LOAD CENTERS,40A,DP			1	\$	25.22
48100005	BREAKER,QO SER LOAD CENTERS,15A,QO115,SP			6	\$	10.96

General DMS Spare Parts Cross Reference List

Adaptive Part Number	Part Description	Approved Commercial Spare Parts
1509101001	SWITCH,TIMER,SPST,12HR,NO HOLD	TORK: A512H
50600003	FLOURESCENT BULB,3'45WATTS,CW, HO	GE LIGHTING # F36T12/CW/HO
50600004	BALLAST,55W,HO,CS(-20F,2BULB	ADVANCE TRANSFORMER: F42T12/HO
30300002	DIODE MODULE,POWER,220A,30V,1/4in TERM	INTERNATIONAL RECTIFIER: 220CMQ030
30350014	TRANSORB,385VAC,2500A PEAK,UL/CSA/VE	LITTELFUSE: V385LA10P
1507100601	HUMIDITY SENSOR, 3%, OUTSIDE AIR	GENERAL EASTERN: MRH-3-OA
30350019	SURGE PROTECTOR,2 PAIR,10KA,-40C/85C	EDCO: PC642C-008LC
30670005	THERMOSTAT,CLOSE>120F,OPEN<90F	SELCO: CA-120-QCH
48000007	RELAY,10A,3-32VDC,24-280VAC,SPST,NO	CRYDOM: D2410
48000009	RELAY,24-280VACOUT,SPST,3-32VDCIN,NO	CRYDOM: D2425
48008203	RELAY,90-280VACIN,SPST,3-32VDCOUT,NO	CRYDOM: DC60SA3
46000026	FAN,230CFM,172x150x51mm,120V,TACH/WIRES	SINWAN: S172SAN-11-1WB(w/TACH OUTPUT-TTL5V)
1509110301	FAN MONITORING PCB ASY,AC FANS	CONTROL RESOURCES: 030M92010
30670754	THERMOSTAT,OPEN >150F,CLOSE <120F	SELCO: OA-150
30676014	HEATER,150W,120VAC,10-32 STUDS,1.5x8"	VULCAN: OS1208-150A
30352001	SURGE ARRESTOR,DISCRETE,120VAC,M18-120	CITEL: M18-120
48100006	BREAKER,QO SER LOAD CENTERS,20A,QO120,SP	SQUARE D: QO120
48100020	BREAKER,QO SER LOAD CENTERS,40A,DP	SQUARE D: QO240
48100005	BREAKER,QO SER LOAD CENTERS,15A,QO115,SP	SQUARE D: QO115